

# Science for Environment Policy

## Advising on which fish to eat is short term solution to protect against mercury exposure

**A US study has** concluded that issuing public health advice on fish consumption is the best short-term solution to reducing people's exposure to mercury contamination. Reducing mercury emissions at source is considered a longer-term solution. Health advice should be targeted towards populations at greatest risk and consider the pollution levels of the water from which the fish came.

**Mercury is a powerful toxin** that can affect the nervous and cardiovascular systems in vulnerable people, such as children. Most mercury pollution comes from human activities, particularly coal-fired power plants and the industrial production of cement and chlorine.

Mercury emitted to the atmosphere is eventually deposited back onto land and water where bacteria can convert it to methylmercury (MeHg), the most toxic form of mercury. MeHg enters food webs and, in waterways, it becomes concentrated in predatory fish higher up the food chain. Contaminated fish consumption is the main source of MeHg exposure for humans.

In this study, the researchers linked two models to investigate the effect that different policies have in protecting vulnerable people from exposure to mercury in locally-caught, freshwater fish. One model examined the exposure of different at-risk populations to mercury, including subsistence fishers and women and children. The other model examined MeHg accumulation in fish found in a sample of stream basins in North America.

The three policy options examined by this study in relation to the modelling results were: 1.) watershed management strategies which could limit mercury levels in fish, 2.) reducing total mercury levels in the water by implementing a Total Maximum Daily Load (TMDL), and 3.) issuing fish consumption advice.

Modelling results suggested that blood MeHg levels were lower in people who ate fish types further down the food chain. However, strategies to limit mercury levels in fish were found to negatively affect ecosystem services. For example, increased forested cover enhances regulation of water flows, but can limit the amount of light reaching a stream, thereby reducing the growth of algae. This concentrates any MeHg into a smaller pool of food at the base of the food chain. Increased wetlands coverage improves flood control, for example, but also boosts the conversion of mercury to MeHg. Higher nutrient levels in streams promote eutrophication, but also distribute any MeHg throughout a larger mass of algae, thereby reducing bioaccumulation throughout the food chain.

The TMDL of mercury necessary to bring a stream into compliance for the relevant water quality standards varies with each stream system, for example, varying amounts of forest cover affect concentrations of mercury in local fish. Atmospheric deposition is a significant source of mercury pollution, and policies that limit emissions at source are considered to be a long-term solution to reducing environmental contamination, as it could take decades before MeHg levels are reduced enough to protect fish consumers.

Eating fish has considerable health benefits, but it can be difficult to balance safe levels of fish intake with the potential effects of consuming MeHg. In the short-term, fish consumption advice may be useful for informing different population groups in specific locations which types of fish to eat and which types to avoid.



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